



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/565,265	01/25/2006	Jurgen Denul	016782-0346	7815
22428 7590 01/25/2010 FOLEY AND LARDNER LLP SUITE 500 3000 K STREET NW WASHINGTON, DC 20007				
EXAMINER				
MILLER, DANIEL H				
ART UNIT		PAPER NUMBER		
1794				
MAIL DATE		DELIVERY MODE		
01/25/2010		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/565,265

Applicant(s)

DENUL ET AL.

Examiner

DANIEL MILLER

Art Unit

1794

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 November 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 4-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 4-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-8508)
Paper No(s)/Mail Date _____

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/2/2009 has been entered.

Claim Rejections - 35 USC § 103

1. Claims 1 and 4-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Derflinger et al (US PG PUB 2005/0003241) in view of Yang (Materials Letters 57 (2003) 3305-3310).
2. Derflinger teaches a substrate covered by a metal layer (2b) and another layer containing nitrogen (2a) and then a second metal layer (3) covered by a carbide layer either (4a) or (4b) and then covered with a hard carbon layer (4a) (see figure 5). The top carbon containing layer can be optionally replaced with a diamond like coating ([0039-0041]). The deposition method includes the formation nano-crystalline Carbides in an inert atmosphere ([0065-0069]; and [0071]).
3. The layers can comprise Ti or Cr and the nitride containing layer can comprise CrN (see claims 1, 7, 8, and 10).

4. Regarding claims 10-12, the layers have the same thickness as applicant's claimed thickness (see ref. claims 25-31).
5. Regarding claims 13-15, given the substantial similarities of the compositions and thickness of the layers disclosed by the combined references and the instantly claimed invention (and disclosed examples) one of ordinary skill would expect the combined referenced invention to have substantially similar properties to those claimed by applicant barring evidence presented to the contrary.
6. Derflinger is silent as to a DLN (Diamond Like Nanocomposite) coating.
7. Yang teaches that DLN films are advantageous for protective coatings particularly those requiring high hardness and low friction in contact with counter materials, and good adhesion between the film and substrate (see Intro.). The DLN films have advantages over traditional diamond like carbon film in that they adhere to a variety of substrates better and have excellent thermal stability not found in diamond like coatings and represent a significant advance in both stability and the ability to tailor specific properties of the coating (See Intro.).
8. It would have been obvious to one of ordinary skill in the art at the time of the inventions to substitute the DLN coating of Yang for the more traditional DLC coating of Derflinger and to additionally remove layer 4b as unnecessary because the DLN films have advantages over traditional diamond like carbon film in that they adhere to a variety of substrates better and have excellent thermal stability not found in diamond like coatings and represent a significant advance in both stability and the ability to tailor specific properties of the coating (See Intro Yang.), therefore the additional carbide and

Art Unit: 1794

free carbon layer (4b) would be recognized by one of ordinary skill to be unnecessary for a DLN and the modification would be expected by one of ordinary skill to improve the wear resistant properties of the coating of Derflinger.

9. Regarding claims 16-17, Yang teaches a (PECVD) Plasma Enhanced Chemical Vapor Deposition (DLN) film produced in a manner substantially similar to applicant's disclosed coating and therefore would be expected by one of ordinary skill to have substantially similar composition. Further regarding claim 17, with regards to the claimed compositional percentages, in the alternative, it would be obvious to optimize the claimed percentages of components to within applicant's broadly disclosed range by optimizing the hardness and wear resistance of the coating, taking advantage of the DLN films ability to be tailored to have specific properties (as taught by Yang above). No patentable distinction is seen.

10. Regarding claims 18-19, Derflinger specifically teaches processing the carbon coating layers in an inert atmosphere (see above), while Yang teaches processing the coating in a mixture of Hydrogen, carbon containing gas also with an inert gas (Ar; see abstract). Given that the obvious rejection replaces the Yang top coating for the Derflinger and that both (especially the Yang coating) comprise an inert gas it would also be obvious to provide the inert Ar gas of Yang.

11. While Derflinger in view of Yang are silent as to the percentage of inert (Ar) gas present in the diamond film one of ordinary skill would expect to adjust the levels of each gas (or vapor) component used for formation of the coating in order to form an optimally coating with high hardness and low friction (as desired by Yang) and in so

providing the coating provide a percentage of inert gas within applicants claimed range of, 0.5% to 5%.

Response to Arguments

12. Applicant's arguments filed 10/1/2009 have been fully considered but they are not persuasive.

13. Applicant acknowledges that Derflinger teaches depositing a diamond film over layers 4 (such as in figure 5 ref., see instant remarks page 5).

14. Applicant's change of the claim language to a transition layer "consisting of" is acknowledged (remarks page 6). However, it is not believed to prevent a finding of obviousness over the references.

15. Regarding the newly amended claim language, it would have been obvious to one of ordinary skill in the art at the time of the inventions to substitute the DLN coating of Yang for the more traditional DLC coating of Derflinger and to additionally remove layer 4b as unnecessary because the DLN films have advantages over traditional diamond like carbon film in that they adhere to a variety of substrates better and have excellent thermal stability not found in diamond like coatings and represent a significant advance in both stability and the ability to tailor specific properties of the coating (See Intro Yang.), therefore the additional carbide and free carbon layer (4b) would be recognized by one of ordinary skill to be unnecessary for a DLN and the modification

Art Unit: 1794

would be expected by one of ordinary skill to improve the wear resistant properties of the coating of Derflinger.

16. Further regarding applicant's arguments that the carbide layer contains free carbon unlike the claimed layer "consisting" of a carbide is further unconvincing because most carbide formation is not 100% complete and comprises some free carbon within the carbide, as known by one of ordinary skill. One of ordinary skill would understand that some free carbon impurity would exist absent a showing to the contrary.

1. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

17. Applicant has provided no scientific rationale for why one of ordinary skill would not have combined the two references.

18. Regarding claims 13-15, given the substantial similarities of the compositions and thickness of the layers disclosed by the combined references and the instantly claimed invention (and disclosed examples) one of ordinary skill would expect the combined referenced invention to have substantially similar properties to those claimed by applicant barring evidence presented to the contrary.

19. Regarding applicant's arguments that the claimed percentages are not taught or obvious, it would be obvious to optimize the claimed percentages of components to

Art Unit: 1794

within applicant's broadly disclosed range by optimizing the hardness and wear resistance of the coating, taking advantage of the DLN films ability to be tailored to have specific properties (as taught by Yang above). Applicant has not refuted this assertion with evidence on the record and to date no patentable distinction is seen.

20. Regarding newly added claims 18-19, Derflinger specifically teaches processing the carbon coating layers in an inert atmosphere (see above), while Yang teaches processing the coating in a mixture of Hydrogen, carbon containing gas also with an inert gas (Ar; see abstract). Given that the obvious rejection replaces the Yang top coating for the Derflinger and that both (especially the Yang coating) comprise an inert gas it would also be obvious to provide the inert Ar gas of Yang.

21. While Derflinger in view of Yang are silent as to the percentage of inert (Ar) gas present in the diamond film one of ordinary skill would expect to adjust the levels of each gas (or vapor) component used for formation of the coating in order to form an optimally coating with high hardness and low friction (as desired by Yang) and in so providing the coating provide a percentage of inert gas within applicants claimed range of, 0.5% to 5%.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DANIEL MILLER whose telephone number is (571)272-1534. The examiner can normally be reached on M-Th.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Sample can be reached on (571)272-1376. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David R. Sample/
Supervisory Patent Examiner, Art Unit 1794

/Daniel Miller/
Examiner, Art Unit 1794